

The Subspecies and Forms of the Tailed Birdwing *Ornithoptera (Schönbergia) paradisea* Staudinger (Lepidoptera : Papilionidae)

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Introduction

During the process of investigating various taxa of the Ornithoptera for inclusion in a Monograph of the Birdwing-genera in preparation, some new forms of various status have been discovered. The authors consider that any description of new forms above that of individual variation should appear only in entomological periodicals, and propose therefore *herein* the following new subspecies of *O. (S) paradisea* Staudinger 1893. As to the individual forms, much confusion exists on the criteria of their validity. Within the genus Ornithoptera and its subgenera, to a lesser degree also within the allied genera Trogonoptera and Troides, a large scale confusion exists around the numerous forms and subspecies named previously. It is therefore necessary to establish descriptions of the normal fluctuation in the pattern of such variable species and subspecies, and this will be dealt with in the abovementioned Monograph. Most individual variations occurring in these genera appear to follow a more or less gradual change between two or more extremes, and can hence be enumerated in a graphic polygon and be statistically worked. Once the extremes are established, all names for "intermediate" forms may be considered unnecessary. Until now it has not been possible to identify and describe such series as thoroughly as is required, and for this reason alone the descriptions of the new individual forms identified by the present authors will appear solely in the Birdwing Monograph. The characters of a number of new forms are established, but we will, with a very few exceptions, desist from naming them until the complete range of normal variation has been investigated.

The Geographical Subspecies and Forms of *O. (S) paradisea* Staudinger, 1893.

The geographical distribution of *O. (S.) paradisea* presents us with some interesting problems. Until now all known specimens have been referred to either of three different subspecies.

1. *paradisea paradisea* Staudinger, 1893: Huon Peninsula to Astrolabe Bay in lowlands. This is the nominate subspecies and is well known.
2. *paradisea flavescens* Rothschild, 1897: Etna Bay, probably lowland. This is based on a sole female specimen and its status is doubtful.

3. *paradisea arfakensis* Joicey & Noakes, 1915: Arfak Mts. of the Vogelkop Peninsula, high altitude. This is a very distinct purely high-altitude subspecies, and the distribution is separated from that of the nominate subspecies by a waste area.

A study of museum material and certain recent specimens enables us to separate and describe a number of geographical subspecies of *O. (S.) paradisea*. All the new subspecies differ more or less distinctly from the type form, but most important is the discovery of geographical intermediates from higher altitudes. It is however, not yet possible to link the populations from the Central Ranges with those from the Northern Ranges and the Huon Peninsula, but indications are that we are now approaching a better understanding of the spreading of the ancestral forms of *paradisea* and its sole close relative, the peculiar *O. (S.) meridionalis* Rothschild, 1897 (see figure 1).

In the separation of the new forms, the pattern of the male abdomen is of importance: a *complex* median pattern occurs in typical *p. paradisea* from the lowlands. A *simple* median pattern occurs in the high-altitude forms from the Northern and Central Ranges. In the Northern specimens the median line is accompanied by a pale, whitish border, but no such border is present in the Central males recorded to date. Certain simple patterned males are known from the area inhabited by the typical form, but indications are that these are all medium to higher altitude specimens. We consider the following geographical subspecies:

1. The typical *paradisea paradisea*, inhabiting low altitudes in the Huon Peninsula to the west. The westernmost limit, which was formerly in the Astrolabe Bay area, is moved to East Sepik River. Abdomen with a complex pattern in the male sex, a little variable. Dorsal hair-fringes pale ochraceous to brownish.

- 1b. A small degenerate form of the above, inhabiting the southernmost (?) areas of the distribution of the nominate sp. (1). Status uncertain. Lowlands only.

2. *paradisea borchi*. This newly described subspecies occurs in the Central parts of the Northern Ranges: Toricelli and Alexander Mountains, and at Dreikir, East Sepik district, at altitudes from 1500 feet (rarely) 2000 to 3000 feet. Male abdomen with a simple median pattern, dorsal fringes snow white, outer margin of HW averaging straighter, additional golden and iridescent green spots present with a larger frequency than in the nominate subspecies. Females with modified wing-shape and pattern.

Ornithoptera (Schönbergia) paradisea borchi ssp. nov.

Holotype male: N.E. New Guinea: Toricelli Range, 2000 feet, 16 June 1973. FW: the wings appearing "narrower" than in the nominate subspecies, the wingspan being $4 \frac{5}{8}$ ", this character appears fairly constant in the high-altitude

specimens. Pattern and colouration very similar to *paradisea* *paradisea*, the iridescent green areas more yellowish and producing a brightly golden-yellow reflection. In the lower part of the median area is a diffused spot or patch of black scales within the Cubital band. Except for the abovementioned patch, the outlines of the coloured bands are more clean-cut and regular than in the nominate subspecies. The Subcostal green streak short but prominent, the Costal streak long and prominent. The basal portion of the Radial band streak-formed and pointed, reaching closer to the base than in average *p. paradisea* males. The Anal band broad, being as broad as the black area that separates it from the Cubital band: it ends abruptly at mid-dorsum, not being streak-like prolonged as in most *p. paradisea* males.

HW: very similar to *p. paradisea*, but inclined to be narrower towards the tornus. The black outer margin narrower at apex. The presence of a prominent patch of iridescent green scales at the base of the tail appears to be a fairly constant character in high-altitude specimens: in the type male this patch is, at base of tail, just as broad as the iridescent green which extends down the wing and onto the tail. Anal fringe of hair snow white. The HW cell-spot of flat semi-translucent golden scales modified in shape, its edge towards the dorsal margin being abruptly bent at an angle near its distal end, not being regularly curved as in the nominate subspecies.

Abdomen: It is in the abdomen where the major characters of this subspecies are evident. Median line simple, i.e. clear and clean-cut, not being complex as in *P. paradisea* (figure 2) dark greyish black and extending the full length of the abdomen to the last segment. The dark median line bordered with a relatively wide band of almost white scales gradually diminishing in width towards the apex: these white scales are relatively long and narrow and appear to have a somewhat waxy consistency. This scaling very dense, the scales curling inwards towards the median line. Remaining scaling of abdomen normal, clear brilliant light cadmium yellow. Along the upper margin or base of tergites 3 and 4 the general scaling is inclined to become somewhat sparse, leaving an extremely narrow border of shining black chitin: this appears also to a much lesser degree at the base of the second tergite.

Length of forewing: $2\frac{1}{2}$ " , length of Hindwing including tail 2" .

Allotype female: FW similar to *p. paradisea* but markedly broader from costa to tornus, the wing thereby attaining a somewhat different shape. The subapical row of white spots prominent, all spots as long as in the nominate subspecies but broader. The discal markings consist of the usual two white patches, the lower of which is large and not diffused by dark scaling at edges, and a third smaller spot beneath them. The submarginal row as in *p. paradisea*. The cell-spot longer than

broad, unsymmetrical, being bi-parted on the left wing, three-parted on the right. HW: markedly more dentate along the termen than in *p. paradisea*, this character particularly prominent at the termination of veins 4 and 5 (figure 3). Posterior edge of blackish-brown area at the base less complex in pattern than that of the nominate subspecies, marginal black broader. Within the pale band the overall diffusion of scattered brownish scales extends well into the discoidal area, leaving only a relatively small area of cream-coloured scales at the disc. The central row of black spots large and prominent, the spots larger than in average *p. paradisea*. Especially the spot above the anal angle is prominently enlarged. This character is reminiscent of *O. (S.) meridionalis* (figure 3).

Abdomen pale bistre, immaculate without any median line or smudge.

Wingspan $5\frac{1}{2}$ " , length of FW $3\frac{1}{2}$ " , breadth at widest point 2" .

3. (no name) (Form or subspecies?) Inhabiting western parts of Central Ranges at higher altitudes: Snow Mts. Male specimens have the abdomen with a simple median pattern consisting of a dark median line *without* the pale border. Base or upper margins of tergites 3 and 4 without a dark line. The status of these interesting specimens remains uncertain.

3b. The "subspecies" *flavescens* Rothschild from Etna Bay, is based on a single female specimen which apparently is only an individual variation. Status uncertain, but indications are that it may be connected to the above 3.

4b. (no name) clinal form or subspecies? Inhabiting the areas south of Geelwink Bay, in vicinity of Wangaar, at higher altitudes. Only known in female sex, but several specimens known. It is somewhat intermediate, but has stronger affinities to *ssp. arfakensis*. This explains why we hesitate to see this form in connection with no. 3, which is otherwise closer geographically. Status remains uncertain.

4. *paradisea arfakensis* Joicey & Noakes 1915. The very distinct subspecies from Arfak Mts. Higher altitudes only.

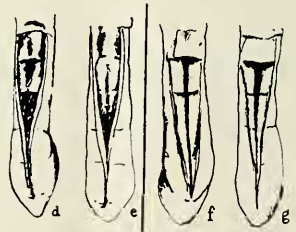
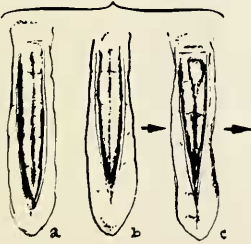
Conclusions

All specimens hereto known of the tailed species *Ornithoptera (Schönbergia) paradisea* have been referred to either the nominate subspecies from lowlands in N.E. New Guinea, or to the high-altitude *ssp. arfakensis* from western New Guinea. A third "subspecies", *flavescens* Rothsch. is only known in one female specimen. Recent studies necessitate a re-arrangement of the various forms, inasmuch as diverging geographical populations have been discovered. One new subspecies is described from higher altitudes in the Northern Ranges: Toricelli. The name *flavescens* may, when correct status of the new taxa are established, remain that of an individual female form. A new geographical form, which is not named, is recorded from areas between that of *ssp. arfakensis* and the last mentioned. The briefness of this paper is explained by

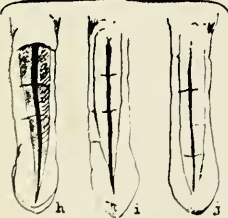


Fig. 1

1 complex pattern
typical *p. paradisea*



2 simple pattern
sap. borchi



3 simple pattern
central form

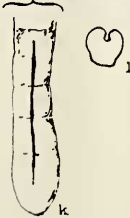


Fig. 2.